Affordable Care?
The Impact of State Participation in Health Insurance Exchanges on Premiums

MPP Professional Paper

In Partial Fulfillment of the Master of Public Policy Degree Requirements
The Hubert H. Humphrey School of Public Affairs
The University of Minnesota

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May 5, 2014

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I: Introduction

The Patient Protection and Affordable Care Act (ACA) of 2010 initiated many policies to address high uninsurance rates and rising healthcare costs. One policy, the health insurance exchanges (also called marketplaces), was introduced to facilitate the purchase of qualified health plans by individuals not covered by an employer or public program by creating a platform for consumers to explore and compare plans. The health insurance exchanges established in 2013 have been the subject of media attention, given the various technological problems that have afflicted the enrollment processes. However, premiums in these new individual insurance markets have received less attention.

In this paper, I examine how premiums vary with state involvement in the health insurance exchanges through exchange governance, plan management authority, and plan management strategy. By better understanding the possible impact of exchange policy variations between states, it may be possible to consider what level of state involvement is needed for the health insurance exchanges to function optimally. The results of this analysis suggest that states governing their own exchanges have lower premiums than partnership or federally facilitated exchanges.

II: Background

The United States has a unique healthcare system based on market principles. In this way, the US is very different from the nationalized systems of healthcare common among its peers in the Organization for Economic Co-operation and Development (OECD). The US is plagued with high uninsurance, high healthcare expenditures, and poor health outcomes relative to other OECD countries. The ACA was passed to address the growing concerns about the comparatively poor health outcomes of Americans and the growth in national health expenditures.

Healthcare Costs

In 2011, almost 18 percent of the US economy was generated by the healthcare industry; with over $8,500 per capita spent on healthcare annually (OECD, 2013). This figure is 250 percent higher than the OECD average of $3,300 (OECD, 2013). More than half of US health expenditures are private, whereas the majority of spending in OECD countries is public (OECD, 2013). Despite these substantial expenditures, U.S. healthcare outcomes are worse, with lower life expectancy and higher rates of obesity and chronic conditions than the OECD average (OECD, 2013).

Since the 1970s the growth in national health expenditures has exceeded growth in gross domestic product (GDP). The US Department of Health and Human Services projects that health expenditures growth will continue to outpace GDP growth in the next decade, with spending comprising 20 percent of GDP by 2022 (U.S. Department of Health and Human Services, 2013).

Uninsured Americans

In 2013, there were approximately 48 million non-elderly uninsured Americans, representing almost 18 percent of the population (The Kaiser Commission on Medicaid and the Uninsured, 2013). The majority of these uninsured are not simply experiencing a gap in coverage but have lacked health coverage for a year or more (Kaiser Commission, 2013). With the recent recession, the number of uninsured increased as individuals lost employment and employers cut benefits.

Many cannot access affordable health insurance on the private insurance market, citing cost as the greatest barrier to coverage (Kaiser Commission, 2013). Only 1.5 percent of uninsured Americans choose not to purchase health insurance because they do not think they need coverage. By contrast, approximately one in three uninsured Americans say they do not have health insurance because they cannot afford the premiums (Kaiser Commission, 2013).

The consequences of lacking health coverage have been well documented as detrimental to individuals and communities. One in four adults without health coverage forgoes necessary medical care each year due to the costs; the uninsured population overall is less likely to receive preventive care or to receive treatment for chronic conditions (Kaiser Commission, 2013). Overall those without health coverage tend to have worse health status than those with health coverage as they lack the means to diagnose early and treat conditions effectively, leading to higher mortality rates (Kaiser Commission, 2013).

Affordable Care Act

In 2010, the Affordable Care Act (ACA) was passed in part to address the high uninsured rate and unsustainable growth in national health expenditures. The ACA implemented several measures including: (1) the individual mandate stating that individuals (and some employers) must purchase health insurance or pay a penalty, (2) expansion of the Medicaid program to cover a wider population of low income adults and children, and (3) the health insurance exchanges to reform the individual insurance market.

The individual mandate works to incentivize those without insurance to purchase health insurance, or apply for public coverage if eligible, by imposing a financial penalty (based on income) if individuals cannot prove health coverage status. The Medicaid expansion, made optional by a 2012 Supreme Court ruling, allows states to expand their Medicaid programs with federal funding to cover all children regardless of income and all adults with income below 138 percent of the federal poverty line. Despite these measures, policy makers perceived that with these measures alone health coverage would still not be accessible to the entire population, thus the creation of the health insurance exchanges.

Health Insurance Exchanges

Health insurance exchanges were created to facilitate the purchase of qualified health plans and to distribute premium subsidies based on income for individuals and families. The exchanges were intended to be implemented by each state, but states had the choice of opting for a federally facilitated exchange or partnership exchange. The exchanges function as portals that present health coverage options to individuals based on their geographic location and income; it is the new portal for Medicaid enrollment as well as private insurance options.

Plans are grouped into metal levels (bronze, silver, gold, and platinum) to standardize and simplify the presentation of plans to consumers. The metal levels indicate how much coverage a plan offers consumers, taking into account variations in deductible, coinsurance, and out-of-pocket maximum. Bronze plans offer 60 percent actuarial coverage, meaning between deductibles co-insurance and premiums the consumer will shoulder 40 percent with insurer responsible for 60 percent. The actuarial value of silver plans is 70 percent, gold is 80 percent, and platinum is 90 percent. The federal subsidies are pegged to the cost of the second lowest cost silver plan. These subsides are available to those making less than 400 percent of the federal poverty line.

There is considerable variation between states in exchange implementation. Seventeen states chose to develop their own exchange, seven states chose to create a partnership exchange, and the remaining 27 states defaulted control to the federal government in developing and implementing the exchange. **Exchange governance** responsibilities include establishing a governance body to manage the exchange, creating the online portal for consumers, formulating a method of raising revenue to fund the exchange in the future, and encouraging enrollment through a marketing campaign and customer assistance.

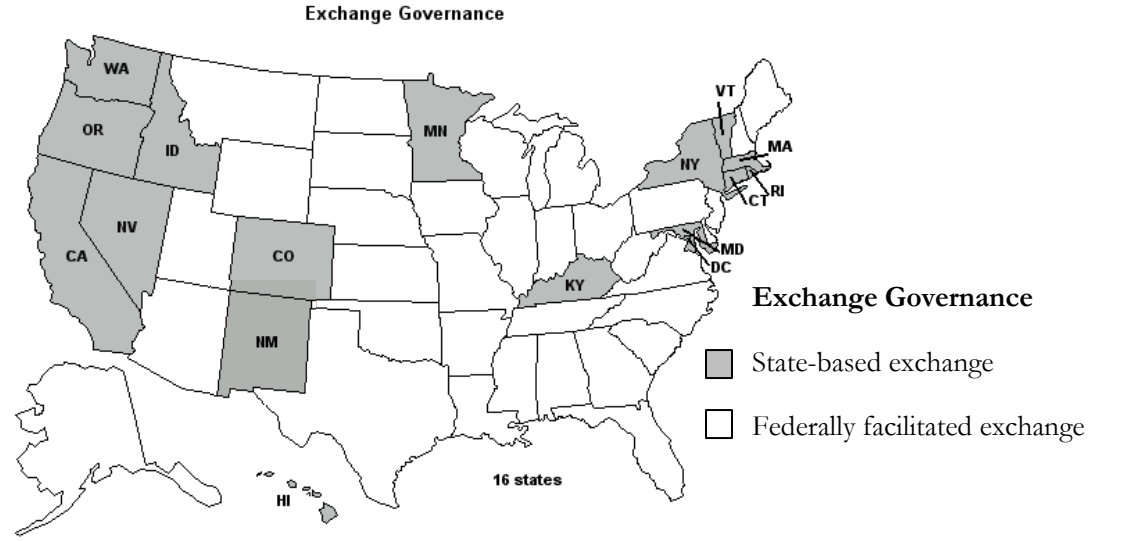
Plan management authority is controlled at the state level by seven states with federally facilitated exchange governance, and by all partnership and state exchanges for a total of 31 states with plan management authority and 20 states where the federal government has plan management authority. Plan management for the exchanges means approving qualified health plans and interacting with issuers about premiums. Variation also is present in **plan management strategy**, with most states (41) simply acting as a clearinghouse and accepting all plans that meet their criteria. Ten states chose to act as active purchasers—taking a more hands-on approach to working with health plan issuers in the state and negotiating premiums, networks, and benefits for plans sold in the exchange. Table 1 and Figure 1 present these three variations of state involvement.

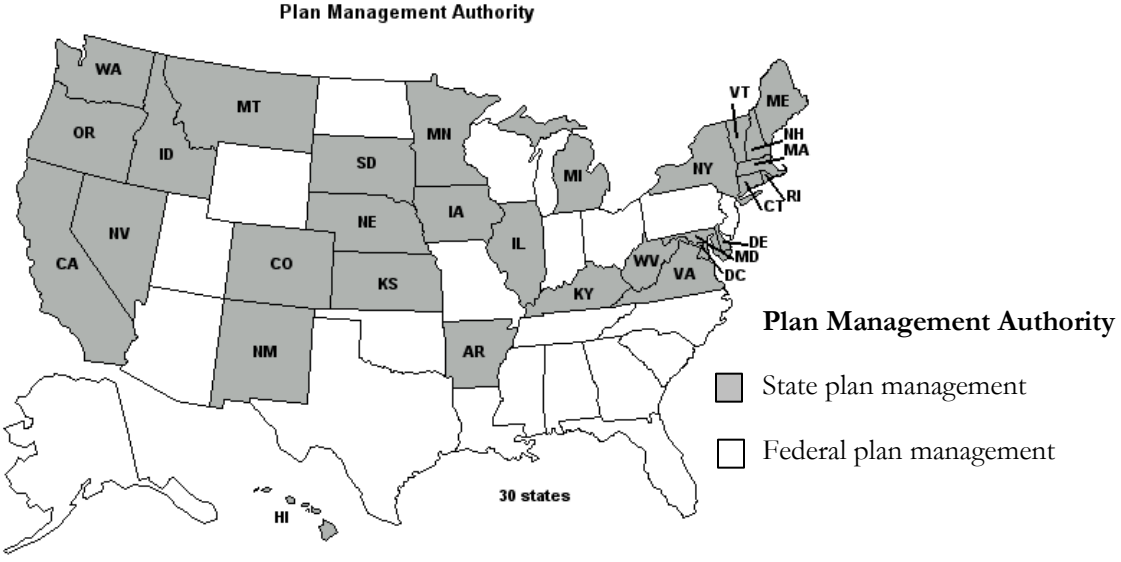
States are divided into rating areas, ranging from a single state-wide rating area in smaller states to 67 in Florida. In total, there are 501 rating area across the 50 states and the District of Columbia. Insurers in each state can decide to participate in some or all rating areas. To participate in a rating area, insurers must offer at least one silver and one gold plan. These health plans must at minimum meet the essential health benefits laid out in the federal requirements.

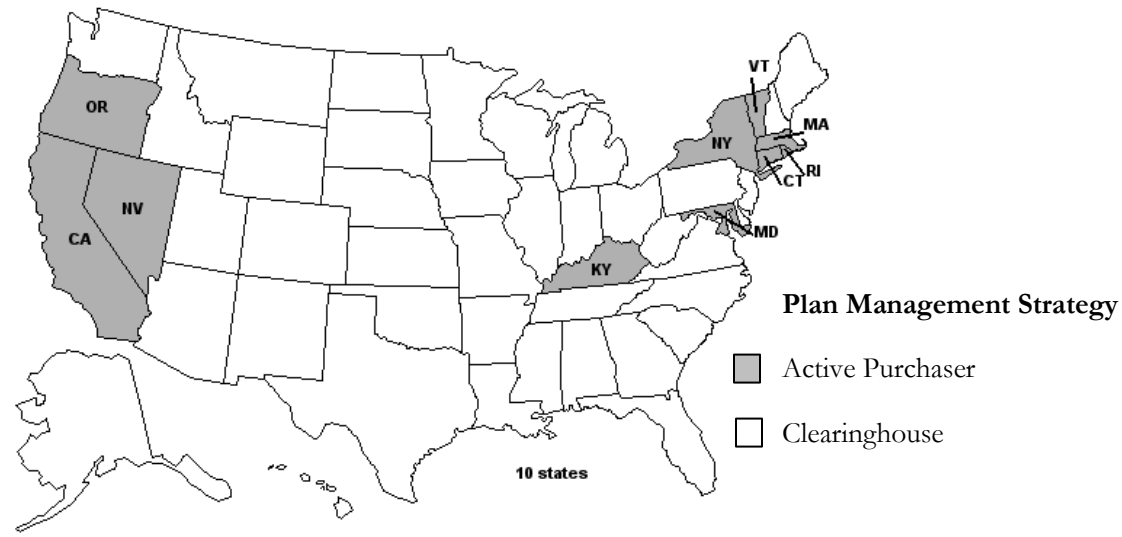
Table 1: State Choice in Exchange Involvement

	Greater ← State Involvement → Less		
Exchange Governance:	State (17)	Partnership (7)	Federal (27)
Plan Management Authority:	State (31)		Federal (20)
Plan Management Strategy:	Active Purchaser (10)		Clearinghouse (41)

Figure 1: State Choice in Exchange Involvement







III: Literature Review

Managed competition provides the theoretical underpinnings for the ACA's health insurance exchanges. Regulating the health insurance market has historically been a state responsibility. Although federal regulations are increasingly forcing state action, states still maintain considerable autonomy in regulating state insurance markets. The health insurance exchanges of the ACA are no different. Certain basic regulations apply to all state marketplaces but allow states a range of policy choices within these federal guidelines. The role that states play as regulators in the exchanges is essential to the success of these marketplaces.

The Need for Regulation in the Individual Health Insurance Market

Adverse selection, the actions resulting from asymmetry of information between consumers and insurers, is one of the greatest problems in the health insurance market. Healthy individuals tend to abstain from purchasing insurance or purchase low value insurance, while high risk or less healthy individuals purchase more insurance coverage. When consumers purchase coverage according to their personal need and preference, the insurance market becomes destabilized; when insurers take on an increasingly riskier and sicker beneficiary pool, they must raise premiums to account for the sicker population. Beneficiaries on the margins of finding value in health insurance will drop their coverage as premiums increase beyond what is valuable for them as individuals. This process results in market failure as premiums become astronomically expensive because only the sickest, highest-cost individuals remain in the risk pool.

Adverse selection in an unregulated market can produce market failure. If only low risk individuals drop insurance coverage, this results in higher premiums for those who remain in the market. Eventually the increasing premiums push all but the catastrophically sick out of the insurance market. In reaction to adverse selection of consumers, insurers utilize their own risk selection, by trying to minimize entry of high risk individuals into their risk pools and by attracting low risk individuals through marketing, underwriting, and benefits designs. These actions by insurers result in inequitable coverage, a characteristic of the individual market pre-ACA, in which high-risk individuals could be charged higher premiums than low-risk individuals, and those with preexisting conditions could be denied coverage entirely.

Managed Competition as Basis for Creation of Health Insurance Exchanges

Managed competition is a concept developed by Alain Enthoven during the 1970s and 1980s as a reaction to these problems inherent in the health insurance market. Managed competition centers on how a sponsor of the market, such as a government, can work as a regulator to institute a structure and process to manage the health insurance market (Enthoven, 1988). Enthoven argues that with appropriate management, the government can encourage competition on price, quality, and consumer satisfaction, the result being a better healthcare system (Enthoven, 1988).

Within managed competition, consumers choose a plan from the regulated market and insurers work within their own processes (such as contracting with healthcare providers) to promote efficiency. It is essential that the sponsor of the market is more than a just a passive regulator, but actively engage to meet the needs of the market in order to address the risk associated with adverse selection. The sponsor must work with all necessary stakeholders and be responsive and engaged in managing the market actively though constant oversight and awareness. With regards to the exchanges as outlined in the ACA, it is unclear if there is an advantage in creating a competitive marketplace for active state involvement compared to active federal involvement.

A key criticism of the Enthoven model is the ability of governments to effectively reach a happy medium of regulation and prevent health plans from circumnavigating the regulatory framework (Hughes Tuohy, 1999). If governments over-regulate, the market will turn into a uniform arena where all health plans are essentially the same and charge the same price—resulting in loss of innovation and motivation by health plans to increase efficiency (Sipkoff, 2003). If governments under-regulate, there is the potential for the health insurance market to take on many of the possible adverse features, destabilizing the market and resulting in a market failure.

Another criticism questions the ability for consumers to choose from between plans in a way that promotes efficiency and competition. Consumers must have reasonable understanding of health insurance in order to choose wisely from among the various plans, and some studies doubt the ability of consumers to make wise choices, with market inertia eventually taking over and limiting competition as consumers stick with the status quo of their current coverage for simplicity's sake (Sofaer, 1993). Both of these criticisms indicate the importance of an effective regulator.

Regulating for Managed Competition in the ACA

According to Enthoven, the market sponsor must establish an effective framework: "establishing rules of equity, selecting plans, managing the enrollment process, creating price-

elasticity demand, and managing risk selection" (Enthoven, 1993). The impacts of ineffective regulation will result in a failed market at worst or in less severe cases resulting in an inability of managed competition to reduce prices or improve quality.

The authority to regulate the insurance market falls on two levels: state and federal. At the federal level, the ACA mandates certain market regulations and dictates the range of state policy decisions by setting general guidelines (Greaney, 2010). The states have the ability to make policy choices within this federally determined range.

The ACA addresses many issues of risk in the insurance market uniformly across states. In order to promote broader insurance coverage, the ACA limits the tools that insurers have used to manage their risk pools. The ACA limits experience rating, a tool insurers use to adjust premiums and plans to the risk of the beneficiary but which generates inequity among beneficiaries. Also, new regulations require that individuals are offered insurance regardless of pre-existing conditions. On the other hand, the individual mandate works to encourage healthy individuals to enter the individual health insurance market, thus creating a healthier risk pool, although they have the option of paying the penalty rather than paying for insurance. Including a range of risk among beneficiaries is essential for insurers and for market stability, given new constraints in their ability price according to individual beneficiary risk (Blumberg & Pollitz, 2009). Additionally some literature has found that larger markets result in lower premiums, due to economies of scale (Greaney, 2010).

The ACA also sets the medical loss ratio (MLR) at 80 percent, meaning that 80 percent of the premiums paid must go to medical care, and the remaining 20 percent can be allocated for administrative purposes. The ACA's impact of medical loss ratio regulation in the individual market will have an uncertain effect on premiums; although premiums may decrease as a result, insurers could meet the MLR requirement through other means, such as reducing administrative costs (Abraham & Karaca-Mandic, 2011). This regulation will also disparately impact states, as states had a variety of MLR regulations pre-ACA. Therefore in some states, insurers have already been following the ACA's MLR regulation.

Overall, a greater burden of risk falls on the insurer under the ACA; although the individual mandate will help to expand the risk pool to include a healthier beneficiary population, the ACA also limits use of strategies that the insurance industry previously used to manage risks. These various regulations implemented across all states at the federal level heighten the importance of the state role in managing the individual insurance market.

State Choice in Regulating Exchanges to Promote Competition

Prior to the ACA, Blumberg and Pollitz (2009) foresaw that exchanges would require a strong market regulator to manage risk, enroll beneficiaries, and encourage cost containment; extrapolating to the present conditions, any responsibilities that are not outlined in the ACA will either fall to the state or will default to federal control. This flexibility in state policy choice could be essential in ensuring the effectiveness of an exchange as a competitive marketplace.

Greaney (2010) takes a comprehensive look at the role of state in regulating these exchanges, and emphasizes the need to provide insurers with tools that minimize risk in order to remain solvent. He points to many aspects of regulation under state control that may increase or decrease competition, with a focus on the necessity of the state to regulate the individual market outside the exchange as well as the market within the exchange; without which high and low risk pools may gravitate to different markets, impacting premiums and competitiveness (Greaney, 2010). The choice of a state to take on the role of an active purchaser is also important to Greaney in mitigating the effects of adverse selection by increasing competition among insurers. But, it is important to note that regulations will impact market competitiveness differently across states since each state has a different insurance market, each with a different level of competition among insurers. These "variations in markets, cultures, and state regulations will necessitate individualized approaches"(Greaney, 2010). Although Greaney is not commenting on the possible impact of a state control of the exchange, it seems logical that a state would be better at meeting the unique needs of its own insurance market than would the blanket regulations of the federal government.

State involvement in the exchange could improve negotiation with the insurers and efforts to recruit new insurers to participate in the exchange, resulting in lower premiums (Corlette & Volk, 2011). On the other hand, higher state involvement could entail greater control over the insurers, additional certification criteria and requirements on product choices, and greater efforts to tailor policies to the need of the state's population. Such additional requirements may result in higher premiums (Corlette & Volk, 2011).

In theory, policy choices that keep the state actively involved in managing the market indicate a greater involvement in the exchange and a greater state commitment to creating a competitive marketplace. Dash, Monahan, and Lucia (2013) note that in the past states that attempted to establish an exchange were hindered by challenges in addressing adverse selection and enrolling enough beneficiaries to create a competitive marketplace. States conducting their own plan management may have an advantage in addressing adverse selection in the market, as they will be

able to apply consistent oversight to all plans available in the individual market, offered both within and outside the exchange (Dash, Monahan, & Lucia, 2013).

Prior to the exchange implementation, insurers and brokers advocated for the clearinghouse strategy, arguing that a larger pool of insurers and plans would improve competition and result in lower premiums, while other stakeholders claimed an active purchaser strategy has greater potential to negotiate lower premiums (Cantor et al., 2011). It is not clear whether the active purchaser or the clearinghouse model will promote greater competition.

Higher levels of state involvement in the exchanges could suggest that these states can better coordinate meeting the needs of various the stakeholders, monitor local markets, and take measures to avoid adverse selection. It could also mean more burdensome regulation that increases premiums. This paper will examine if, states with an active role in the exchanges are better able to meet the needs of the market and promote a greater degree of competition as measured by lower premiums compared to states that did not 'opt-in' to engage in the exchanges.

Impacting Premiums Though State Regulation

Literature examining how state regulations in insurance markets have impacted premiums is also helpful in understanding the impact of state involvement in insurance markets. Two studies in particular are relevant: (1) Pauly and Herring (2007) consider the impact of state regulations on premiums in the individual insurance market before the ACA and (1) Blavin et al. (2012) simulate the impact of state policy choices in the ACA on premiums.

Pauly and Herring (2007) find that rate regulations, requirements that insurers justify rate increases to state regulators, had little impact on premiums and coverage in the pre-ACA market. Although the impact observed was small, such regulations were associated with lower premiums among high risk populations but were also associated with a higher number of uninsured individuals. This study is measuring the impact of an actual policy, not the impact of a general idea of a state actively managing a market. The Pauly and Herring study may indicate that greater controls on insurers, including regulations specified in the ACA and policy options available to states, will reduce premiums, albeit with tradeoffs. The tradeoff, a greater uninsured population, will likely be less drastic under the ACA, between encouragement to purchase coverage from the individual mandate and subsidies available in the market.

Blavin et al (2012) test the potential that state policy choice in the small group market will impact cost and enrollment by simulating ACA policy choices, in particular considering age banding

policies. They find that the impact of a state's choice in reducing or eliminating age banding from the federally set default depends on age of the policy holder. Blavin et al found that premiums for young adults increased, and while premium subsidies will insulate many individuals from these increases, fewer young people will seek insurance. By contrast, with age banding older non-elderly adults will have lower premiums and enrollment of this age demographic increases (Blavin, et al, 2012). As a result of this, and other findings in the simulation, Blavin et al suggest that state policy choices in exchanges will only have a small impact on the cost and enrollment.

Both these studies find that there are tradeoffs in premiums and enrollment that occur with regulation. At the same time, Blavin et al and Pauly and Herring find that there are generally small changes in premiums and uninsured rates from regulation. From these analyses, it is difficult to infer how regulation of the exchanges will impact premiums.

Individuals as Consumers of Healthcare

The role of individuals will also have an important role in determining premiums in the health insurance exchanges. Because managed competition is essentially selling health plans directly to a consumer, the role of consumers is key to making managed competition work.

In his view of managed competition, Enthoven (1988) states that the lowest price health plan should be subsidized for all individuals, and consumers who wish to purchase more generous coverage should have to pay the difference themselves. This, in theory, means that a consumer will value the additional benefits of coverage enough to purchase those benefits—increasing their price sensitivity relative to a standard set of benefits and creating a benchmark from which they can measure the added value of more generous benefits. The health insurance exchanges, as outlined by the ACA, offer subsides for individuals and families up to 400 percent of the Federal Poverty Line which are pegged to the second lowest cost silver plan. These subsidies will equalize the premiums across bronze and the lowest and second lowest cost silver plans, but price sensitivity exists among more generous plans which cost more than the second lowest silver plan.

Experiences in the Netherlands' health insurance exchange, where market inertia has been detrimental to competition, also indicate that consumer behavior is important to competition. Market inertia is present when individuals remain with the same plan because potential price or quality gains are not perceived to be worth the hassle of switching to a new plan. In 2011, when premiums rose more than usual, a greater number of individuals switched plans, citing raising premiums as the main reason. Although this indicates some price sensitivity, those who considered

switching choose not to switch despite premium increases because there was no discernable difference in quality of care (Brabers, Rooijen, & Jong, 2012). Learning from the Dutch experience, it will be important to consider the possible effects of state policy choices in the exchanges on market inertia and thus on competition within the individual market as more years of enrollment and premiums data become available.

States will have an important responsibility in providing information to create informed consumers: choosing what plan information to show and how it is relevant to the consumers' decision making process. States will also have a role in consumer education initiatives to raise awareness, encourage enrollment, and educate on how health plans work. The success of states in engaging consumers in the health insurance market may impact premiums in the long run, but as this is the first enrollment period under the health insurance exchanges, this factor will not likely impact premiums yet. Discerning this effect will be an important consideration of later analyses.

IV: Data

Because the health insurance exchanges are the product of a newly implemented policy, few analyses have been conducted on the health insurance exchanges, and currently no existing analyses use the rating areas as the observation level. As a result, I compiled a variety of data sources on the state and county level. The final dataset consists of 501 observations representing each rating area across the 50 states and District of Columbia.

Premiums and Exchange Characteristics

The outcome of interest, monthly premiums, was collected for each rating area based on the premiums for a 29 year old earning more than 400 percent of the federal poverty line (greater than $45,960). The income threshold was chosen in order to access the unsubsidized premium rates. The age of 29 was chosen to represent the young adult demographic, between the ages 25 and 34, which has the highest rates of uninsurance of all Americans.[†]

Information on plans, including premiums, was gathered from the U.S. Department of Health and Human Services for the 34 federally facilitated and partnership exchanges (U.S. Department of Health and Human Services, 2013). For the 17 state-run exchanges, premiums and

[†] The age of 29 years old represents the middle of the young adult age range, and an age still eligible to enroll in a catastrophic plan. Catastrophic plans are only available to individuals under 30 and have a lower actuarial value than bronze plans. Final analysis did not include analysis of catastrophic plans, but data was collected with that intention.

plan information was gathered from state exchange consumer websites or publicly available state government documents. Coinsurance, deductible, and out-of-pocket maximums for all exchanges were collected from ValuePenguin, a website that has collected all premiums information from the exchanges (ValuePenguin.com, 2013). See Appendix A for further details and specific sources for all variables.

Variables indicating state policy choices regarding the exchange governance, plan management authority, and plan management techniques were created using information gathered from the Kaiser Family Foundation and the National Conference of State Legislatures. These variables were then combined to create a series of dummy variables that indicate all possible combinations of these three policy choices, discussed further in the next section.

Population Characteristics

Demographic, economic, and health information are important for controlling observable variation between state and rating area level observations that may affect premiums independently of state exchange policies. This data was available at the county level, from County Health Rankings 2010, and aggregated to rating area level (County Health Rankings & Roadmaps, 2011). Important variables gathered from this source include indicators of health risk: fair or poor health status, prevalence of diabetes, prevalence of obesity, and prevalence of low birth weight births; insurers will consider these characteristics that indicate the health risk of a population when setting premiums. Other characteristics gathered include household income, per capita medical costs, and unemployment rate. State level characteristics were also available from this data source. These variables are important for controlling variations in economic characteristics that may affect the cost of health care in a rating area or state.

Healthcare Market Characteristics

Characteristics of the state insurance market regulation, in particular rate review and medical loss ratio, are important indicators of state regulation of the insurance market before the ACA's implementation. The rate review process of the state can vary from simply monitoring premium rate increases to an active review process that requires insurers to annually justify premiums (National Conference of State Legislatures, 2014). The medical loss ratio (MLR) also indicates extent to which a state was active in regulating the individual insurance market prior to the ACA (America's Health

Insurance Plans, 2010). Variables in the dataset indicate whether or not a state used prior approval as rate review strategy and the level the MLR was set for the individual market.

The Medicaid fee index provides an indicator of how fee-for-service reimbursement rates vary between states by illustrating state variations from the national mean. Although states set Medicaid rates, this variable will help act as a measure of healthcare costs uncoupled from the state's health status (Zuckerman & Goin, 2012).

Another measure of healthcare costs, state level premiums data from the individual health insurance market before the implementation of the exchanges, were collected from two sources. The U.S. Government Accountability Office (GAO) which provided minimum and median premiums in each state from 2013 for a variety of demographic groups, including 30 year old men and women with deductible, coinsurance, and out-of-pocket maximum (U.S. Government Accountability Office, 2013). There were a few missing values among the deductible and coinsurance which were left as missing. The Manhattan Institute created a weighted state average of premiums for 2013 based on the 5 lowest cost plans in the most populous zip code of each county for a 27 year old (Manhattan Institute, 2013).

Also included as an independent variable is a variable indicating if a state recommended a plan from the exchange to act as the essential health benefit benchmark. This indicates if a state recommended a plan with essential health benefits (EHB) beyond those prescribed by the ACA. In order to cover these additional benefits insurers may need to increase premiums in these states (Kaiser Family Foundation, 2013).

Hospital market power is a key influence on premium determination and varies widely by community. The most widely used measure of market concentration is the Herfindahl–Hirschman Index (HHI), calculated by the squared sum of hospital market share, which is measured by dividing the hospitals staffed beds by the total staffed beds in the market. This measure was calculated using data from the Dartmouth Atlas of Health (see appendix for details). Market share is an important determinant of premiums because insurers must negotiate reimbursement rates with providers and the actor with greater leverage—such as market power—will have greater ability to determine reimbursement (Greaney, 2010).

V: Methodology

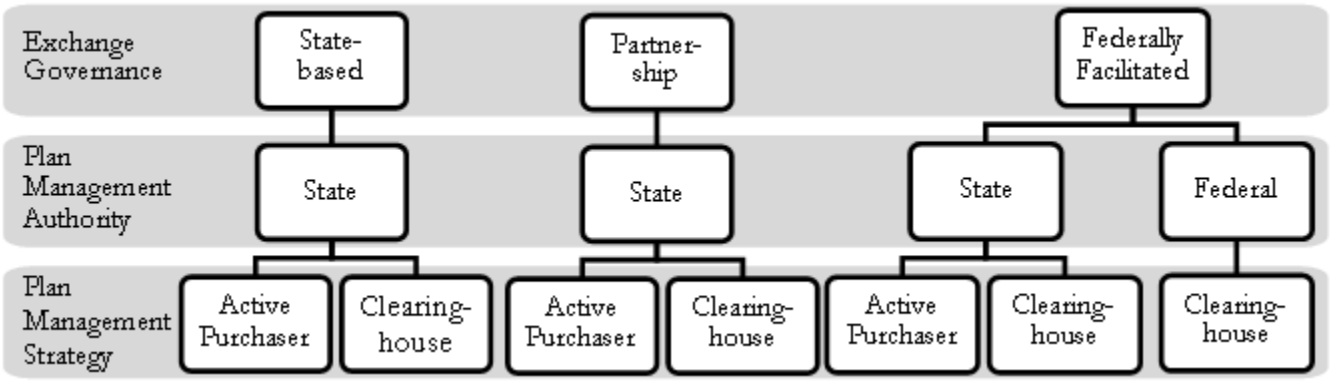
The statistical analysis consists of two models. First, an OLS model with relevant covariates, such as health, demographic, and insurance market characteristics, helps to control for various heterogeneous characteristics between states and rating areas. Second, using pooled premiums as the outcome of interest with the same covariates as the OLS model helps to address heterogeneity, and increases power of the model.

Defining Treatment Variables

As can be seen in Figure 2, there are seven possible combinations of state choices regarding exchange governance, plan management authority, and plan management strategy. States occupy 5 of these groups, as only a small number of states chose active purchaser for their plan management strategy. The 5 exclusive groups of exchange types are presented in Figure 2: (1) State-based exchanges with state plan management and active purchaser for plan management (1-SSA); (2) State-based exchanges with state authority of plan management and clearinghouse for plan management (2-SSC); (3) Partnership exchanges with state authority and clearinghouse for plan management (3-PSC); (4) Federally facilitated exchanges with state authority and clearinghouse for plan management; and (4-FSC); (5) Federally facilitated exchanges with federal authority and clearinghouse for plan management (5-FFC).

States can first choose their exchange governance (state-based, partnership, and federally facilitated). Federally facilitated and partnership exchanges can then choose either to conduct their own plan management or to leave that responsibility to the federal government, and all state based exchanges conduct their own plan management automatically. Any state with plan management authority can either choose to be an active purchaser or a clearinghouse; all exchanges with federal plan management have clearinghouse as their plan management strategy.

Figure 2: Treatment Variable Categorization of State Participation in Exchanges



Observations:							
State	101	7	0	7	0	7	20
Rating Area	67	39	0	56	0	52	287
Treatment	1-SSA	2-SSC		3-PSC		4-FSC	5-FFC

Model 1: OLS Regressions

Use of covariates in the OLS regressions addresses variations across states, such as health status, market size, and regulatory environment. These observable features vary by state and rating area and may be related with both the premiums and the treatment status of a state. Controlling for these observable characteristics will allow the model to examine the difference in premiums by treatment status while holding constant the variation in premiums that occurs with these characteristics. The model is specified as follows:

$$Y = \alpha_0 + \alpha_1 Z + \alpha_2 X' + \epsilon_1$$

Y : One model for each outcome of interest:

- Monthly premium of lowest cost bronze plan
- Monthly premium of lowest cost silver plan
- Monthly of lowest cost gold plan
- Monthly of second lowest cost silver plan

Z : Treatment Variables

- Exchange type as described in Figure 2 (1-SSA, 2-SSC, 3-PSC, 4-FSC, and 5-FFC)

X' : Covariates[‡]

- Number qualified health plans by metal level of plan Y in the rating area (2014)
- Total number of qualified health plans in rating area (2014)
- Deductible of Plan Y(2014)

[‡] See Appendix B for variable definitions and data sources.

- Coinsurance of Plan Y (2014)
- Out-of-pocket maximum of Plan Y (2014)
- Statewide number of insurers participating in exchange (2014)
- Total number of insurers participating exchange in rating area (2014)
- State recommended Essential Health Benefits (EHB) benchmark plan to HHS, (2012-2013), 1=state recommended EHB
- Rating area percent of population living in rural area (2010)
- Rating area percent unemployed (2010), %
- Rating area per capita medical costs (2010), $
- Rating area percent uninsured (2010), %
- Rating area population (2010)
- Rating area percent over 65 years old (2010), %
- Rating area percent under 18 years old (2010), %
- Rating area percent African American (2010), %
- Rating area percent Hispanic (2010), %
- Rating area percent white non-Hispanic (2010), %
- Rating area percent other non-Hispanic (2010), %
- Rating area low birth weight prevalence (2010), %
- Rating area diabetes prevalence (2010), %
- Rating area obesity prevalence (2010), %
- Rating area percent with fair/poor health (2010), %
- Rating area hospital market power unconcentrated (2010), 1=unconcentrated
- Rating area hospital market power moderately concentrated (2010), 1=moderately concentrated
- State had prior approval for rate increases pre-ACA (2010), 1=prior approval
- State mean premiums from before ACA (2013), $
- State Medicaid fee index all services (2012), >1 indicates higher than average Medicaid fees
- State governor Democrat (2010-2012), 1=Democrat

Model 2: Pooled Premiums Regression

The second model adopted makes use of pooled premiums and includes a variety of covariates to control for observed variations across states and ratings areas that may also impact premiums. By running a pooled premium regression rather than four separate regressions, one for the premium levels in the dataset, Model 2 maintains power otherwise lost by running multiple regressions and is better able to fit the reality of how premiums are set. If the variance in premiums across exchanges is different across the various plan types (bronze, silver, gold) this model will have large standard errors, but if the variance is the same the standard errors will be more efficient than in Model 1.

Use of the pooled model means all covariates will have the same coefficients across all plan types, rather than four different estimates, if the impact of state policy decisions on premiums was estimated separately for each plan type. In reality, insurers are setting premiums for all the plans they offer at the same time, and will account for unique characteristics of the market similarly across all plans they offer. The pooled regression is thus more appropriate as state and rating area characteristics should consistently influence the premiums for all plans offered in the exchanges.

The covariates included in this model are the same as Model 1, and address variations across states and premiums, such as health status, market size, and regulatory environment. As with Model 1, controlling for these observable characteristics will allow the model to determine the difference in premiums that exists between treatment categories while holding constant the variation in premiums that occurs due to these characteristics. Model 2 is specified as follows:

$$Y = \alpha_0 + \alpha_1 P + \alpha_2 Z + \alpha_3 P * Z + \alpha_4 X' + \epsilon_1$$

Y : Outcome of Interest
- Premiums—each rating area has four premium observations (lowest bronze, lowest silver, second lowest silver, and lowest gold)

Z : Treatment Variables
- Exchange type as described in Figure 2 (1-SSA, 2-SSC, 3-PSC, 4-FSC, and 5-FFC)

P: Plan Type
- Describing the plan type of the premium observation—lowest bronze, lowest silver, second lowest silver, or lowest gold

$P * Z$: Plan Type * Treatment Variables
- Interaction of the plan type and exchange type treatment variable

X' : Covariates
- Same as Model 1 covariates

VI: Descriptive Statistics

State Demographic Characteristics

Table 2 presents the mean baseline characteristics for selected state characteristics. Political and policy measures, such as party of the governor and state choice on Medicaid expansion, vary considerably between all treatment groups. Democratic governors and choosing to expand Medicaid are more common among states with more active participation in the exchanges. Other observable

differences are clear across treatment categories in most other characteristics. States with a more active role in the exchanges tend to be healthier, with lower rates of obesity and better self-reported health status. While there are differences in indicators of health status, the differences between states are less drastic than the differences on policy choices. All these differences indicate that selection bias is present, as each state made a different combination of policy choices with regards to the exchanges. These choices were based on a variety of different characteristics, some of which can be observed, including the variables in Table 2.

Table 2: Mean Baseline State Characteristics by Treatment Group

	All States	1-SSA	2-SSC	3-PSC	4-FAC	5-FFC
Observations	51	10	7	7	7	20
State Population	5,966,428	8,400,324	3,191,620	4,617,238	3,837,044	6,938,164
Medicaid Expansion	51.0%	100.0%	85.7%	85.7%	14.3%	15.0%
Democratic Governor	39.2%	80.0%	71.4%	71.4%	14.3%	5.0%
Uninsured Rate	14.2%	14.4%	13.5%	14.2%	13.3%	14.6%
Per Capita Income	$39,468	$43,213	$43,332	$37,401	$38,378	$37,349
Unemployment Rate	8.8%	9.9%	8.5%	8.5%	7.0%	8.9%
Under 18	23.4%	22.5%	23.2%	22.8%	23.4%	24.3%
Over 65	13.5%	13.6%	12.8%	14.5%	14.2%	13.1%
African American	10.9%	8.9%	9.4%	10.3%	6.4%	14.3%
Hispanic	10.8%	14.5%	16.3%	6.4%	5.6%	10.5%
Non-Hispanic White	70.4%	68.8%	58.1%	78.9%	81.6%	68.7%
Female	50.7%	50.9%	50.5%	50.9%	50.5%	50.6%
Rural	25.9%	18.7%	16.7%	32.1%	35.4%	27.3%
Obesity	27.9%	25.8%	23.9%	29.8%	28.6%	29.4%
Low Birth Weight	8.1%	7.8%	8.0%	8.3%	7.4%	8.6%
Diabetic	9.1%	8.5%	7.6%	9.8%	8.9%	9.7%
Fair or Poor Health Status	14.9%	14.6%	13.5%	15.1%	13.0%	16.1%
Per Capita Medical Costs	$ 9,014	$9,015	$7,813	$9,184	$8,624	$9,511
Household Income	$50,823	$55,375	$54,126	$49,545	$49,309	$48,369
Prior Approval Authority	70.6%	90.0%	85.7%	85.7%	71.4%	50.0%
Mean Lowest Premium Pre-ACA	$149	$190	$143	$124	$137	$144
Medicaid Fee Index	1.2	1.2	1.2	1.0	1.2	1.2
Recommended EHB	52.9%	100.0%	71.4%	71.4%	28.6%	25.0%
Insurers with Greater than 5% Marketshare	4.2	5.9	3.9	3.4	3.4	4.0

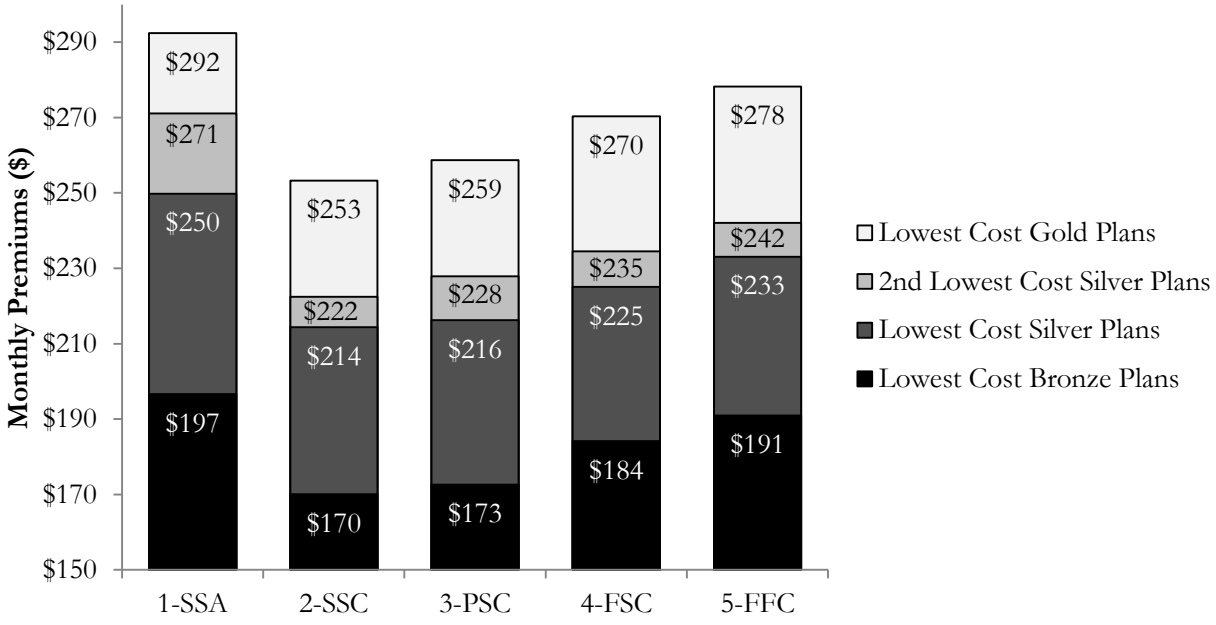
Describing Premiums

As is seen in Figure 3, the mean lowest premium in each plan category varies by no more than $30 dollars across the five state policy choices. States fully responsible for the exchange (1-SSA) and states with no involvement in the exchange (5-FFC) have the highest premiums, while those with middling engagement in the exchanges have the lowest premiums. Overall there is no clear relationship between the extent to which a state in involved in the exchange and the premium levels.

1-SSA, representing states that choose the most active participation in the exchange have the highest premiums in each premium category. The difference between 1-SSA premiums and the other categorizations of state policy choices is statistically significant across all premium levels. See Tables 9-12 in Appendix B for a complete listing of differences in premiums and statistical significance. The states with no participation in the exchanges, indicated by 5-FFC, have the second highest premiums. Premiums for 5-FFC states are significantly different when compared to all other treatments groups but 4-FSC. The mean premiums for 2-SSC and 3-PSC are almost identical, indicating that the variation between state and partnership governance may be minimal.

Also of importance to the pooled regression model is homogenous variance across plan types. From Figure 3, it appears as though there similar relationship between each the premium levels across the treatment categories. This supports use of a single pooled premium regression over four separate regressions.

Figure 1: Average Monthly Premiums by State Engagement in Exchanges



VII: Results

My analysis took two stages: Model 1—OLS regressions using a variety of covariates as controls, and Model 2—a pooled premium regression using the same covariates as Model 1. These models illustrate how state policy decisions to participate in exchanges may impact the premiums of 29 year olds, using the rating area as the observation level. Full results are available in Appendix C.

Model 1: OLS with covariates

As can be seen in Table 3, the OLS model results indicate that only states governing their own exchange and plan management with a clearinghouse model (2-SSC) have statistically lower premiums than states with complete federal control of their exchange (5-FFC). Holding all else constant, states in the 2-SSC group had premiums $22 to $43 lower than states which allowed the federal authorities to take full control of their exchange (5-FFC). These 2-SSC states also have the lowest premiums of all states. In general, the coefficients of this model indicate that any state control in the exchanges results in lower premiums compared with all federally controlled exchange, but the relationships are not statistically significant. See Table 3 for summarized results.

Table 3: Impact of State Engagement in Exchanges on Premiums Compared to 5-FFC

	Lowest Cost Bronze Plan	Lowest Cost Silver Plan	Second Lowest Cost Silver Plan	Lowest Cost Gold Plan
1-SSA	-11.64	-12.11	-5.25	-30.64***
2-SSC	-22.84***	-29.59***	-22.21**	-43.41***
3-PSC	-1.28	2.91	-1.18	-9.89
4-FSC	-9.50*	-7.18	-3.96	-11.16
R^2	.4466	.4999	.5016	.5057
N	501	501	501	501

Legend: * p<0.1; **p<0.05; ***p<0.01

The comparison between 2-SSC, 3-PSC, and 4-FSC states indicates that the governance strategy does have a significant effect on with premiums, as that is the unique policy identifier of these three treatment categories. States in the 2-SSC category, with state exchanges, have significantly lower premiums than partnership exchanges and federally facilitated exchanges which also have state plan management authority using the clearinghouse strategy (3-PSC and 4-FSC).

States with state-based exchanges have premiums ranging from $22 to $34 lower compared to partnership exchanges and $23 to $43 lower compared to federally facilitated exchanges. See results in Table 16 in Appendix C. Comparing partnership and federally facilitated exchanges though, there is no indication that states with partnership governance have lower premiums than states with federally-facilitated exchanges.

Although there appears to be a relationship between premiums and state-based exchange governance, this OLS model does not lend strong support to the hypothesis that states with greater engagement in the exchanges will see lower premiums. The results for this model are obtained by running four separate regressions, where each distinct level of premiums is considered a separate outcome of interest. As a result, this model has less power than the pooled regression I perform in Model 2.

Model 2: Pooled Premiums Regression

With the pooled premiums model, I only run one regression compared with the four regressions in Model 1. Comparing the adjusted R^2 of the models reflects the improvement in fit. The adjusted R^2 for the four regressions in Model 1 fell between 0.44 and 0.51, while for the pooled premiums model the adjusted R^2 is 0.62, meaning the pooled premium model explains more of the variation in premiums between treatment categories.

Premiums compared to reference category (5-FFC).

States that have no responsibility in the exchange, categorized by 5-FFC, act as a reference category against which the other categories measure the impact of the varied levels of state choice to be actively engaged in the exchange on premiums. As in Model 1, 2-SSC states have the lowest premiums compared to all other treatment categories as demonstrated in Table 4. For almost every plan level there is a statistically significant difference between premiums for states that chose to govern their own exchange and plan management (1-SSA and 2-SSC) compared to states that took no responsibility for their exchange (5-FFC). States that chose a state-based exchange have premiums between $18 and $35 lower than the states with no responsibility for their exchange (5-FFC). The partnership and federal exchanges have lower premiums than the entirely federally run exchanges (5-FFC), but the differences are not statistically significant. Additionally, it is important to note that 1-SSA states have the second lowest premiums; this is a dramatic change from the means comparison when this group of states had the highest premiums. See Table 4 for summarized results.

Table 3: Impact of State Engagement in Exchanges on Premiums Compared to 5-FFC

	Lowest Cost Bronze Plan	Lowest Cost Silver Plan	Second Lowest Cost Silver Plan	Lowest Cost Gold Plan
1-SSA	-17.90**	-19.12**	-3.44	-17.15**
2-SSC	-25.81***	-30.73***	-27.99***	-35.12***
3-PSC	-1.49	-2.71	1.54	-6.14
4-FSC	-4.31	-11.01**	-7.93	-8.33
R^2	0.6227			
N	2004			

Legend: * p<0.1; **p<0.05; ***p<0.01

Governance Strategy.

Comparing states in the 2-SSC, 3-PSC, and 4-FSC treatment categories allows a direct comparison of governance by holding the constant plan management authority and strategy. State-based exchanges have significantly lower premiums than partnership and federal exchanges, holding constant the covariates, plan management authority, and plan management strategy. Premiums are $24 to $30 lower in state-based exchanges compared to partnership exchanges, and $20 to $27 lower compared to federally-facilitated exchanges. There is no statistical difference in premiums between states with partnership and federally-facilitated exchanges. See Table 5 for summarized results.

Table 5: Impact of State Engagement in Exchanges on Premiums Compared To 4-FSC

	Lowest Cost Bronze Plan	Lowest Cost Silver Plan	Second Lowest Cost Silver Plan	Lowest Cost Gold Plan
2-SSC	-21.49***	-19.72**	-20.07**	-26.78***
3-PSC	2.82	8.30	9.47	2.19

Legend: * p<0.1; **p<0.05; ***p<0.01

Plan management Authority.

A comparison of 4-FSC and 5-FFC provides a direct comparison of plan management authority by holding constant federally facilitated exchange and clearinghouse plan management. There is no conclusive evidence of a relationship between plan management authority and premiums based on this analysis. As can be seen in Table 4, states with state plan management authority have

lower premiums than states with federal plan management authority, but this relationship is not significant apart from the lowest cost silver plan.

Plan management strategy.

There is no statistically significant difference in premium between 1-SSC and 2-SSA states, which indicates there may be little relationship between premiums and plan management strategy. Holding plan management authority and exchange governance constant, bronze and silver premiums are not significantly different when plan management strategy varies between clearinghouse and active purchaser. For the second lowest cost silver and lowest cost gold plans, states with an active purchasing strategy have significantly higher premiums, between $18 and $25. This is not conclusive evidence that there is a relationship between plan management strategy and premiums. See Table 6 for summarized results.

Table 6: Impact of State Engagement in Exchanges on Premiums Compared to 2-SSC

	Lowest Cost Bronze Plan	Lowest Cost Silver Plan	Second Lowest Cost Silver Plan	Lowest Cost Gold Plan
1-SSA	7.90	11.61	24.56***	17.96**

Legend: * p<0.1; **p<0.05; ***p<0.01

VIII: Limitations

The results of this study are intended to provide a preliminary understanding of how state engagement in the exchanges impacts premiums, but not a definitive answer as the data and methodology have been restricted by resource constraints. Preliminarily, it appears as though states that are more engaged in their exchanges, particularly through exchange governance, tend to have lower premiums than states that default to federal control.

Data Limitations

As a newly implemented policy, there are no datasets with all relevant variables collected with the rating area as observation level. While collecting relevant variables, adjustments had to be made to data, such as taking a weighted average of county level data to create a rating area level

observation. These adjustments further open the analysis to error as a result of miscalculations in creating the dataset.

Data on insurance premiums, deductibles, co-insurance, and out-of-pocket maximums are gathered from a variety of sources and from databases such as valuepenguin.com. While this is the best data currently available, there may be a lack of consistency across sources, such as in the definition of co-insurance or deductibles, as health insurance plans generally have a variety of rules in each plan (such as copays versus co insurance and different payments for in- and out-of-network providers). Despite the possibility of inconsistencies in the data, this should not impact the analysis greatly.

Given that only cross-sectional data is currently available at the rating area level, statistical methods for analyzing the impact of state involvement in the exchanges on premiums are limited. After accumulating more years of data, further analysis can be conducted with more rigorous methodologies.

Using five treatment categories also decreased the number of observations in each category, relative to a binary treatment category. By dividing states by multiple levels of policy choices, this analysis loses power in the sample size, with as few as 39 rating area level observations in a single treatment category. Changing treatment categories to indicate fewer policy choices, such as testing exchange governance alone, may increase the power of the model by increasing the number of observations in each of three treatment categories. This would be less theoretically robust by equating states that are not directly comparable, ignoring other state policy choices such as plan management authority that may also impact premiums.

Methodological Limitations

The pooled premium regression maintains power of the dataset by determining within a single model how premiums at all four plan levels varied with regards to policy choices and controlling variables. The model assumes that premiums are normally distributed. After testing the distribution of premiums, it is clear that these are not normally distributed. This is a problem for the pooled premium model that may be addressed through improvements to the model. Despite the concerns of violating the assumption of normal distribution, these results still provide valuable insight into the relationship between state participation in exchanges and premiums given the similarity between the OLS and pooled regression results, and the improvements in fit of the pooled results over OLS results.

The greatest threat to the soundness of these results is my inability to address selection bias at this time. Because states made choices regarding how they interact with the exchanges, there are observable and unobservable characteristics which may be related both to individual market health insurance premiums and state choice regarding the exchanges. While this study does control for many observable differences (for example, political party of the governor and previous state regulations of the individual market), unobservable heterogeneity (for example, unmeasurable cultural differences) is still present and unaccounted for in this model.

Due to selection bias, the results from these models are not necessarily causal, but rather they represent observed differences adjusted for some important observable characteristics. This study does not make claims of causality based on results, but can report that these differences in premiums exist and are real either due to exchange participation or a set of characteristics which influence premiums. The exchange participation treatment categories are observable variation resulting from these unobservable differences, and still is representative of a difference between these states and exchanges.

This study considered other methods to correct for selection bias, but they were insufficiently robust to provide meaningful analysis. A difference-in-differences analysis was considered, but not on a rating area level, thus losing considerable variation from within the states. The premiums from the pre-ACA period were not directly comparable to the premiums in the post implementation period as a result of the introduction of rating area level markets with the ACA. As a result, the difference-in-differences approach was not an appropriate method for determining the relationship between premiums and state policy choices. Future analyses should be conducted using difference in difference analysis as states change their governance and plan management strategies.

Another option to better address the selection problem is to find and use an instrumental variable (IV) to proxy for the treatment and to avoid selection bias. Although a few options appeared to be potential IVs for this analysis, none were strong in the first stage (F statistics<10) and they were theoretically weak. Additionally, use of IV only be able to proxy for a single, binary level of state policy choice, resulting in general results not directly applicable to the specific policy choices of states.

IX: Discussion & Policy Implications

Despite the limitations on the study, the results still can inform policymakers' understanding of the exchanges and the role of states in implementing and governing the exchanges, especially as no other study has yet analyzed how the variation in state policies has impacted premium. The strength of this study is its timeliness in shedding light on a little understood policy with many stakeholders and interested observers.

The results of this and future research on the topic may impact the states' interaction with respect to governance and plan management of the exchange. From this analysis, there is evidence suggesting that state-based exchanges have significantly lower premiums than federal or partnership exchanges. Given this information, states and the federal government could consider creating a path for federally facilitated exchanges and partnership exchanges to convert to a state-based exchange. Given time, incentives, and capacity building it may be possible for all states to voluntarily make this change. There is no evidence currently that the plan management authority is important in reducing premiums. Additionally there is inconclusive evidence that clearinghouse plan management strategy results in lower premiums compared to states with active purchaser plan management.

A direct application of these results may be found in the example of Minnesota's exchange MNsure. Minnesota is a state based exchange with clearinghouse plan management run by the state during this first enrollment cycle, or 2-SSC—the group of states with the lowest premiums overall. MNsure authorities have considered moving from a clearinghouse strategy toward that of an active purchaser. Given the results of this study, that change in plan management strategy may not impact premiums significantly, and in fact could result in higher premiums. The MNsure authorities should consider their reasons for switching from clearinghouse to active purchaser to assess if that change in plan management strategy meets their goals, whether the goal is reducing premiums or providing better consumer protections through closer monitoring of insurers and plans.

Although it appears as though state engagement in exchanges is beneficial to lowering premiums, this may be due to unobservable characteristics. If a state is forced to become responsible for the exchange or if they are in some way unprepared for the responsibility, (for instance if a state does not have the resources or expertise in the matter), it is likely that the federal government, with its resources and experience, then would be a better choice to manage these responsibilities. This analysis does not speak to the comparable quality of policymaking and implementation of the states versus the federal government. Nor does this speak to the political environment that plays an

important role in how states interact with the ACA. Since each state is unique it is possible that in some cases the federal government is currently able to do a better job in effectively regulating the exchange to keep premiums low. As such, this may provide impetus to build states' desire and ability to become more effective regulators.

Prospect of Reducing Health Expenditures by Reducing Premiums

The magnitude of the results is also important on an individual and societal level, if confirmed by other analyses. Statistically significant results hovered around a $25 difference in monthly premiums between state and federal exchanges, meaning individuals who do not qualify for subsidies could save $300 annually on premiums. At a societal level, regardless if an individual qualifies for subsidies, these premiums will be paid into the healthcare system. Using the CBO projected enrollment of approximately 5 million individuals living in states with federal and partnership exchanges, and assuming everyone is a 29 year old, this $300 annual savings per person would save the nation about $1.5 billion annually in national health expenditures. Although this calculation does not reflect real cost savings, it conveys the idea that reducing premiums through competition fostered by state engagement in regulation can reduce national health expenditures substantially.

Future Analyses

Policy briefs on the health insurance exchanges have generally used a single premium per state, whether that is an average or lowest across the state; those analyses lack accuracy by neglecting to account for the full range of premiums as they vary by rating area within states. This study includes premiums and characteristics from all ratings areas, meaning this variation is accounted for in this analysis. This should help set a precedent for using the more accurate rating area level as the observation level in future studies.

Policy briefs on the topic thus far have typically compared premiums directly across states. This gives an inaccurate view of premiums, because premiums are impacted by different state and rating area characteristics. Even if the analysis presented in this paper is not completely accurate due to the inability to address the selection problem effectively, the progression of results shows the extent to which the comparison of mean premiums is misleading and the value of controlling for observable characteristics.

A similar study should be conducted to see if enrollment numbers vary with these state policy choices, since reducing the uninsured populations is another goal of the exchanges. Disparities between states' ability to enroll their uninsured populations may support or repudiate the findings of this study.

There is potential for this study, and follow up studies, to impact state and federal policy surrounding the health insurance exchanges and insurance markets. The exchanges are a novel concept in American healthcare that have not been studied and are generally not well understood. This study helps to shed light on the impact of the varieties of governance and participation at play across the various exchanges.

X: Conclusion

Health insurance exchanges, as established by the ACA, are not well understood in practice as few functioning examples exist. Studying the new state health insurance exchanges is important to ensure they are an effective strategy in remedying insurance coverage, health expenditure, and health outcomes problems that they were intended to help address. This study focuses on understanding how state policy choices pertaining to their active participation in the exchanges are related to insurance premiums. The results of this analysis suggest that increased states governing their own exchanges have lower premiums than partnership or federally facilitated exchanges. There was no conclusive evidence to indicate that state policy choices on plan management authority and plan management strategy were associated with premiums. These results are preliminary given the data and methodological limitations, but they provide a valuable starting point for considering how exchanges can encourage lower premiums.

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Appendix A: Treatment Variables

Table 4: State Involvement in Exchange

Plan Management Authority and Strategy		Exchange Governance: State		Exchange Governance: Partnership		Exchange Governance: Federal	
State	Active Purchaser	1-SSA					
		Observations:	10 States 67 Rating Areas	Observations:	0 States 0 Rating Areas	Observations:	0 States 0 Rating Areas
		California	Nevada				
		Connecticut	New York				
		Kentucky	Oregon				
		Maryland	Rhode Island				
		Massachusetts	Vermont				
	Clearinghouse	2-SSC		3-PSC		4-FSC	
		Observations:	7 States 39 Rating Areas	Observations:	7 States 56 Rating Areas	Observations:	7 States 52 Rating Areas
		Colorado	Minnesota	Arkansas	Michigan	Kansas	Ohio
		District of Columbia	New Mexico	Delaware	New Hampshire	Maine	South Dakota
		Hawaii	Washington	Illinois	West Virginia	Montana	Virginia
		Idaho		Iowa		Nebraska	
Federal	Clearinghouse					5-FFC	
		Observations:	0 States 0 Rating Areas	Observations:	0 States 0 Rating Areas	Observations:	20 States 287 Rating Areas
						Alabama	North Carolina
						Alaska	North Dakota
						Arizona	Oklahoma
						Florida	Pennsylvania
						Georgia	South Carolina
						Indiana	Tennessee
						Louisiana	Texas
						Mississippi	Utah
						Missiouri	Wisconsin
						New Jersey	Wyoming

Appendix B: Data

Variables	Type, Units, Year	Source
Exchanges Variables:		
Premiums	Dollar, 2014	ASPE-all federal and partnership exchanges state exchange websites-most state exchanges valuepenguin.com-Kentucky and Hawaii
Plan deductible	Dollar, 2014	State Exchange websites-available state exchanges ValuePenguin- all federal and partnership exchanges
Plan coinsurance	Percent insurer covers, 2014	State Exchange websites-available state exchanges ValuePenguin- all federal and partnership exchanges
Plan out of pocket maximum	Dollar, 2014	State Exchange websites-available state exchanges ValuePenguin- all federal and partnership exchanges
Number of metal level qualified health plans in the rating area	Count, 2014	ASPE-all federal and partnership exchanges state exchange websites-most state exchanges valuepenguin.com-Kentucky and Hawaii
Total number of qualified health plans in rating area	Count, 2014	ASPE-all federal and partnership exchanges state exchange websites-most state exchanges valuepenguin.com-Kentucky and Hawaii
Total number of insurers participating in exchange statewide	Count, 2014	ASPE-all federal and partnership exchanges state exchange websites-most state exchanges valuepenguin.com-Kentucky and Hawaii
Total number of insurers participating exchange in rating area	Count ,2014	ASPE-all federal and partnership exchanges state exchange websites-most state exchanges valuepenguin.com-Kentucky and Hawaii
Recommended Essential Health Benefits (EHB) benchmark plan to HHS	Binary, 1=State recommended EHB, 2012	Kaiser Family Foundation (KFF)
Rating Area Characteristics:		
Rating Area Population	Count, 2010	County Health Rankings

Female	Percent, 2010	County Health Rankings
Under 18	Percent, 2010	County Health Rankings
Over 65	Percent, 2010	County Health Rankings
African American	Percent, 2011	County Health Rankings
Non-Hispanic White	Percent, 2012	County Health Rankings
Uninsured rate	Percent, 2010	County Health Rankings
Percent unemployed	Percent, 2010	County Health Rankings
Percent of population living in rural area	Dollar, 2010	County Health Rankings
Per capita medical costs in rating area	Percent, 2010	County Health Rankings
Percent of births low birth weight	Percent, 2010	County Health Rankings
Percent Fair/Poor Health	Percent, 2010	County Health Rankings
Obesity prevalence	Percent, 2010	County Health Rankings
Diabetes prevalence	Percent, 2010	County Health Rankings
Hospital market power (HHI by category)	1-3, 1=concentrated, 2=concentrated, 3=highly concentrated, 2010	Dartmouth Atlas (see note below for calculation)
State Characteristics:		
Party of governor making exchange choice	1=Democrat, 2010-2013	KFF
State had prior approval for rate increases pre-ACA	Binary, 1=prior approval, 2011	NCSL, KFF
MLR	Binary, 1=met NAIC standard, 2012	NCSL
Mean premiums 2013	Dollar, 2013	Manhattan Institute
Minimum premiums 2013	Dollar, 2013	GAO
Minimum Premium Deductible	Dollar, 2013	GAO
Mimimum Premium Coinsurance	Percent insurer covers, 2013	GAO
Mimimum Premium Out of Pocket Maximum	Dollar, 2013	GAO
State Medicaid fee index, all services	State index to national mean of 1, all services, 2012	KFF
Insurers statewide with greater than 5% market share	Count, 2011	KFF
Projected Enrollment	Count, 2013	CBO
State per capita income	Dollar, 2010, 2013	County Health Rankings
Unemployment rate	Percentage, 2010, 2013	BLS
Uninsured rate	Percentage, 2010, 2013	Census
Population	Count, 2010, 2013	Census
Female	Percent, 2010	County Health Rankings
Under 18	Percent, 2010	County Health Rankings
Over 65	Percent, 2010	County Health Rankings

African American	Percent, 2011	County Health Rankings
Non-Hispanic Qhite	Percent, 2012	County Health Rankings
Uninsured rate	Percent, 2010, 2013	County Health Rankings
Percent unemployed	Percent, 2010, 2013	County Health Rankings
Percent of population living in rural area	Dollars, 2010, 2013	County Health Rankings
Per capita medical costs in rating area	Percent, 2010	County Health Rankings
Percent of births low birth weight	Percent, 2010, 2013	County Health Rankings
Percent Fair/Poor Health	Percent, 2010, 2013	County Health Rankings
Obesity prevalence	Percent, 2010, 2013	County Health Rankings
Diabetes prevalence	Percent, 2010, 2013	County Health Rankings

The HHI measure is only useful if it is measuring a meaningful market. In the case of hospitals, two main geographic boundaries are used to delineate the market. Metropolitan statistical areas (MSA) are general measures of a metropolitan areas bounded by the edge of the suburban area. HRRs provide a more meaningful measure of hospital market as they were developed using the geographic dispersion of hospital patients, grouped around hospital needs. Given this, the MSA region is an inadequate measure of hospital markets because the HRRs were created to represent hospital markets. Although HRRs (and MSAs) do not align well with the rating areas, it is a meaningful market that can be vaguely fit to the rating area level to approximate the type of market concentration that is facing insurers trying to offer plans in those markets through the exchanges.

Another disagreement when calculating HHI measure is how to define a hospital. Many hospitals are not run independently but in large systems that can span large geographic areas or with many in a single market. Given we are calculating market share, it makes sense to count hospitals owned by the same group as comprising a single market share because competition between these hospitals is nonexistent, especially when considering provider contracting with insurers. I chose to limit the definition of market share to hospitals with the same owners within HRR.

Traditionally HHI for hospitals is calculated by the number of staffed beds. Given time and resource limitations as well as the dearth of publicly available data about hospitals nationwide, it was necessary to find unique sources that can be adapted. The data that included all necessary variables was found at the Dartmouth Atlas, aggregated from Medicare data for the years 2008-2010. Specifically the data measures End of Life for Medicare Beneficiaries with chronic conditions. The dataset includes HRR, individual hospitals, and hospital system. The dataset though lacked information on staffed beds. Instead I chose to use assigned Medicare patients; this is a measure that represents share of market by representing the capacity of the hospital. While there are problems with this measure, such as selection bias toward hospitals with better outcomes for chronic conditions, these patients are assigned, so selection bias by the individuals is not fully present.

In the end, I calculated an HHI measure for hospitals at the HRR level to define the market. Individual hospitals in systems were aggregated with other hospitals within the same system in the same HRR. Market share was calculated by comparing the number of assigned Medicare

beneficiaries for hospitals/systems within an HRR to the total number of assigned patients squared then summed. Given the constraints in calculating an accurate HHI measure, I was able to assess the adequacy of my estimates by comparing the nationwide range of market power to other published sources.

As is seen in table C, the newly calculated HHI measure falls between two other measures, indicating that it will serve as an adequate proxy of hospital market concentration for this analysis despite the unorthodox methods used.

Table 5: Comparison of National Hospital Market Power

	My Measure (HRR)	Harvard (HRR)	AHIP (MSA)
Unconcentrated	13.8 %	19.0 %	6.6 %
Moderately Concentrated	23.0 %	32.0 %	13.1 %
Highly Concentrated	63.2 %	49.0 %	80.3 %

Table 9: Difference in Mean Premiums for Lowest Cost Bronze Plans

	1-SSA	2-SSC	3-PSC	4-FAC	5-FFC
1-SSA	0				
2-SSC	-$26.59***	0			
3-PSC	-$23.97***	$2.62	0		
4-FAC	-$12.45*	$14.14*	$11.52*	0	
5-FFC	-$5.71	$20.88***	$18.27***	$6.75	0

Table 10: Difference in Mean Premiums for Lowest Cost Silver Plans

	1-SSA	2-SSC	3-PSC	4-FAC	5-FFC
1-SSA	0				
2-SSC	-$35.43***	0			
3-PSC	-$33.52***	$1.91	0		
4-FAC	-$24.75***	$10.68	$8.77*	0	
5-FFC	-$16.75	$18.68***	$16.78***	$8.00	0

Table 11: Difference in Mean Premiums for Second Lowest Cost Silver Plans

	1-SSA	2-SSC	3-PSC	4-FAC	5-FFC
1-SSA	0				
2-SSC	-$48.66***	0			
3-PSC	-$43.18***	$5.47	0		
4-FAC	-$36.53***	$12.12	$6.65	0	
5-FFC	-$29.04***	$19.62***	$14.14**	$7.49	0

Table 12: Difference in Mean Premiums for Lowest Cost Gold Plans

	1-SSA	2-SSC	3-PSC	4-FAC	5-FFC
1-SSA	0				
2-SSC	-$39.13***	0			
3-PSC	-$33.73***	-$5.40	0		
4-FAC	-$22.08**	$17.05	$11.65	0	
5-FFC	-$14.16*	$24.97***	$19.57**	$7.92	0

Legend: * p<0.1; **p<0.05; ***p<0.01

Appendix C: Full Regression Results

Table 13: Model 1 OLS Regression, Impact of State Engagement in Exchanges on Premiums Compared To 5-FFC

	Lowest Cost Bronze Plans	Lowest Cost Silver Plans	Second Lowest Cost Silver Plans	Lowest Cost Gold Plans
1-SSA	-11.64	-12.11	-5.25	-30.64***
2-SSC	-22.84***	-29.59***	-22.21**	-43.41***
3-PSC	-1.28	2.91	-1.18	-9.89
4-FSC	-9.50*	-7.18	-3.96	-11.16
Deductible	0.002	-0.006***	-0.009***	-0.016***
Coinsurance	11.34	-38.21**	-88.40***	-78.45***
Out-of-pocket Maximum	0.007	-0.004*	0.009***	-0.002
Number of Insurers in Rating Area	-6.95***	-7.8671***	-7.7453***	-9.9730***
Unconcentrated Hospital	-3.54	-4.6797	-4.8942	-5.8055
Moderately Concentrated Hospital	2.69	-1.1862	-0.5075	-3.1956
Rating Area Rural	30.14***	27.7571***	25.8855***	34.9857***
Rating Area Unemployed	366.88***	409.5348***	357.8573***	532.3291***
Rating Area Per Capita Medical Costs	-0.003**	-0.0045**	-0.0019	-0.0060***
Rating Area Household Income	0.0005*	0.0009***	0.0004	0.0012***
Rating Area Uninsured Rate	152.86***	235.30***	218.93***	254.37***
Rating Area Population	0.0	0.0	0.0	0.0
Rating Area Under 18	-120.20	-214.85**	-124.61	-250.17**
Rating Area Over 65 Years	-16.92	-73.15	-61.61	-121.19
Rating Area Hispanic	11.59	-4.43	-14.76	-4.57
Rating Area African American	190	2.56	-0.44	-24.94
Rating Area Asian	11.08	20.78	49.20	20.91
Rating Area Non-Hispanic Other	-56.71*	-28.75	-60.39*	-39.16
Rating Area Low Birth Weight	133.90	247.87	273.50	266.99
Rating Area Diabetic	-321.43	-370.12*	-591.10***	-466.59*
Rating Area Obese	9.93	51.30	67.73	105.41
Rating Area Fair/Poor Health Status	-79.50	-51.66	-57.70	-79.83
Democratic Governor	-21.30***	-11.16**	-10.37*	-18.43***
Prior Approval on Rate Review	-11.03***	-17.91***	-10.87**	-16.03***
Mean Lowest Premiums Pre-ACA	0.34***	0.35***	0.35***	0.41***
Medicaid Physician Fee Index	26.03***	18.82**	19.34**	19.28**
State Recommended EHB	9.70**	14.27***	16.66***	14.07**
Medicaid Expansion	7.58	2.65	5.86	10.86
Constant	90.53*	237.81***	187.23***	283.13***
R^2	0.4647	0.4901	0.4992	0.4936
N	501	501	501	501

Legend: * p<0.1; **p<0.05; ***p<0.01

Table 14: Model 1 OLS Regression, Impact of State Engagement in Exchanges on Premiums Compared To 4-FSC

	Lowest Cost Bronze Plans	Lowest Cost Silver Plans	Second Lowest Cost Silver Plans	Lowest Cost Gold Plans
1-SSA	-2.14	-4.94	-1.28	-19.48*
2-SSC	-13.34	-22.41**	-18.24**	-32.26***
3-PSC	8.22	10.08	2.79	1.27
5-FFC	9.50*	7.18	3.96	11.16
R^2	0.4647	0.4901	0.4992	0.4936
N	501	501	501	501

Legend: * p<0.1; **p<0.05; ***p<0.01

Table 15: Model 1 OLS Regression, Impact of State Engagement in Exchanges on Premiums Compared To 3-PSC

	Lowest Cost Bronze Plans	Lowest Cost Silver Plans	Second Lowest Cost Silver Plans	Lowest Cost Gold Plans
1-SSA	-10.3602	-15.0170**	-4.0686	-20.7565**
2-SSC	-21.5682***	-32.4923***	-21.0314**	-33.5283***
4-FSC	-8.2243	-10.0815	-2.7872	-1.273
5-FFC	1.2752	-2.9059	1.1772	9.8855
R^2	0.4647	0.4901	0.4992	0.4936
N	501	501	501	501

Legend: * p<0.1; **p<0.05; ***p<0.01

Table 16: Model 1 OLS Regression, Impact of State Engagement in Exchanges on Premiums Compared To 2-SSC

	Lowest Cost Bronze Plans	Lowest Cost Silver Plans	Second Lowest Cost Silver Plans	Lowest Cost Gold Plans
1-SSA	11.208	17.4753**	16.9627**	12.7718
3-PSC	21.5682***	32.4923***	21.0314**	33.5283***
4-FSC	13.3439	22.4108**	18.2442**	32.2553***
5-FFC	22.8434***	29.5864***	22.2086**	43.4138***
R^2	0.4647	0.4901	0.4992	0.4936
N	501	501	501	501

Legend: * p<0.1; **p<0.05; ***p<0.01

Table 17: Model 1 OLS Regression, Impact of State Engagement in Exchanges on Premiums Compared To 1-SSA, 2014

	Lowest Cost Bronze Plans	Lowest Cost Silver Plans	Second Lowest Cost Silver Plans	Lowest Cost Gold Plans
1-SSA	-11.208	-17.4753**	-16.9627**	-12.7718
3-PSC	10.3602	15.0170**	4.0686	20.7565**
4-FSC	2.1359	4.9355	1.2814	19.4835*
5-FFC	11.6354	12.1111	5.2459	30.6420***
R^2	0.4647	0.4901	0.4992	0.4936
N	501	501	501	501

Legend: * p<0.1; **p<0.05; ***p<0.01

Table 18: Model 2 Pooled Regression, Impact of State Engagement in Exchanges on Premiums Compared to 5-FFC, 2014

	Coefficient
Exchange Type	
1-SSA	-17.9015***
2-SSC	-25.8055***
3-PSC	-1.4873
4-FSC	-4.3084
Plan Type	
Lowest Silver	33.0825***
Second Lowest Silver	38.8685***
Lowest Gold	64.9734***
Exchange Type*Plan Type	
1-SSA*Silver	-1.22
1-SSA* 2nd Silver	14.46**
1-SSA* Gold	0.75
2-SSC *Silver	-4.92
2-SSC * 2nd Silver	-2.19
2-SSC* Gold	-9.31
3-PSC *Silver	-1.22
3-PSC * 2nd Silver	3.03
3-PSC* Gold	-4.65
4-FSC *Silver	-6.70
4-FSC * 2nd Silver	-3.62
4-FSC* Gold	-4.02

Deductible		-0.007***
Coinsurance		-38.48***
Out-of-pocket Maximum		0.001
Number of Insurers in Rating Area		-7.94***
Unconcentrated Hospital		-4.07*
Moderately Concentrated Hospital		-0.82
Rating Area Rural		30.76***
Rating Area Unemployed		419.43***
Rating Area Per Capita Medical Costs		-0.004***
Rating Area Household Income		0.001***
Rating Area Uninsured Rate		194.55***
Rating Area Population		0.000
Rating Area Under 18		-158.45***
Rating Area Over 65 Years		-74.59**
Rating Area Hispanic		2.73
Rating Area African American		-11.02
Rating Area Asian		40.07
Rating Area Non-Hispanic Other		-52.99***
Rating Area Low Birth Weight		214.03**
Rating Area Diabetic		-433.92***
Rating Area Obese		61.77
Rating Area Fair/Poor Health Status		-66.84*
Democratic Governor		-14.95***
Prior Approval on Rate Review		-13.71***
Mean Lowest Premiums Pre-ACA		0.37***
Medicaid Physician Fee Index		21.27***
State Recommended EHB		15.52***
Medicaid Expansion		4.88
Constant		184.55***
	R^2	0.6315
	N	2004

Legend: * p<0.1; **p<0.05; ***p<0.01

Table 19: Model 2 Pooled Regression, Impact of State Engagement in Exchanges on Premiums Compared To 5-FFC

	Lowest Cost Bronze Plans	Lowest Cost Silver Plans	Second Lowest Cost Silver Plans	Lowest Cost Gold Plans
1-SSA	-17.90***	-19.12***	-3.44	-17.15***
2-SSC	-25.81***	-30.73***	-27.99***	-35.12***
3-PSC	-1.49	-2.71	1.54	-6.14
4-FSC	-4.31	-11.01**	-7.93	-8.33
R^2	0.6315			
N	2004			

Legend: * p<0.1; **p<0.05; ***p<0.01

Table 20: Model 2 Pooled Regression, Impact of State Engagement in Exchanges on Premiums Compared To 4-FSC

	Lowest Cost Bronze Plans	Lowest Cost Silver Plans	Second Lowest Cost Silver Plans	Lowest Cost Gold Plans
1-SSA	-13.59*	-8.11	4.49	-8.81
2-SSC	-21.49**	-19.72**	-20.07*	-26.78***
3-PSC	2.82	8.30	9.47	2.19
5-FFC	4.31	11.01**	7.93	8.33
R^2	0.6315			
N	2004			

Legend: * p<0.1; **p<0.05; ***p<0.01

Table 21: Model 2 Pooled Regression, Impact of State Engagement in Exchanges on Premiums Compared To 3-PSC

	Lowest Cost Bronze Plans	Lowest Cost Silver Plans	Second Lowest Cost Silver Plans	Lowest Cost Gold Plans
1-SSA	-16.41**	-16.31**	-4.98	-11.01*
2-SSC	-24.32***	-28.09***	-29.54***	-28.98***
4-FSC	-2.82	-8.30	-9.47	-2.19
5-FFC	1.49	2.71	-1.54	6.14
R^2	0.6315			
N	2004			

Legend: * p<0.1; **p<0.05; ***p<0.01

Table 22: Model 2 Pooled Regression, Impact of State Engagement in Exchanges on Premiums Compared To 2-SSC

	Lowest Cost Bronze Plans	Lowest Cost Silver Plans	Second Lowest Cost Silver Plans	Lowest Cost Gold Plans
1-SSA	7.90	11.61	24.56***	17.96**
3-PSC	24.32***	28.09***	29.54***	28.98***
4-FSC	21.49***	19.72**	20.07**	26.78***
5-FFC	25.81***	30.73***	27.99***	35.12***
R^2	0.6315			
N	2004			

Legend: * p<0.1; **p<0.05; ***p<0.01

Table 23: Model 2 Pooled Regression, Impact of State Engagement in Exchanges on Premiums Compared To 1-SSA

	Lowest Cost Bronze Plans	Lowest Cost Silver Plans	Second Lowest Cost Silver Plans	Lowest Cost Gold Plans
2-SSC	-7.90	-11.61	-24.56***	-17.96**
3-PSC	16.41**	16.31**	4.98	11.01*
4-FSC	13.59*	8.11	-4.49	8.81
5-FFC	17.90***	19.12***	3.44	17.15***
R^2	0.6315			
N	2004			

Legend: * p<0.1; **p<0.05; ***p<0.01